
**Pacific Northwest
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**King County Nearshore Habitat
Mapping Data Report: Picnic
Point to Shilshole Marina**

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March 2001

Prepared for
King County Department of Natural Resources
under a Related Services Agreement
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under Contract DE-AC06-76RLO 1830



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Report: Picnic Point to Shilshole Marina**

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EXECUTIVE SUMMARY

King County has initiated environmental studies on the northern King County and southern Snohomish County portion of the nearshore environment of Puget Sound to support the siting of a new wastewater treatment plant outfall and the King County Wastewater Treatment Division Habitat Conservation Plan. The primary objective of our study was the development of accurate maps of nearshore habitat resources within the Snohomish/King County study area. As such, the results of the study provide a critical basis for assessment of the aquatic habitats and fisheries resources within the nearshore zone (defined as +1 m to -30 m mean lower low water [MLLW]) between Shilshole Marina in Seattle and Picnic Point, slightly north of Edmonds. The depth range was designed to cover all low intertidal and shallow subtidal habitats, including potential rockfish habitat. Our report documents methods used to map the nearshore environment and presents georeferenced maps and summary tables of substrate, vegetation, fish, and macroinvertebrates.

Twenty-two contiguous kilometers of nearshore habitat were mapped within the overall study area during the fall of 1999 using a combination of side scan sonar and underwater-video technologies. The study area was divided into 12 subareas (A through L) for ease of data collection and processing. All data were collected along predetermined survey track lines and linked to a global positioning system. Side scan sonar data and underwater video footage were postprocessed to develop geographical information system map layers of eelgrass (*Zostera marina*), substrate type, total macroalgae, kelp (*Nereocystis luetkeana*), and *Ulva* spp. In addition, map layers

including fish and macroinvertebrate species and selected macroalgae were developed from the video data.

A total of 144 km of video data and 1033 hectares of side scan-sonar data were collected during the survey. The dominant substrate type was sand, occurring in 90% of the study area. A mixed coarse substrate that included gravel, shell hash, and/or cobble occurred to a much lesser extent (9% of the study area) and was generally noted close to shore with a few exceptions. Very little rocky habitat occurred in the study area. Eelgrass occurred to some extent in all subareas, covering approximately 260 hectares, (23% of the study area). Eelgrass was found to a depth of -7 m MLLW with dense coverage (80 hectares) usually associated with a steeper slope, and moderate or patchy coverage (126 hectares) associated with a shallow slope. Sparse eelgrass coverage (50 hectares) was usually found on the inner (shallow) or outer (deep) edges of denser eelgrass meadows. Kelp occurred infrequently (2.6% of the study area) with the exception of several areas, including the Edmonds Underwater Marine Park where its extensive presence prohibited mapping. Approximately two thirds of kelp coverage occurred in mixed coarse substrate with the remaining occurring in sand, usually located on the outer fringes of eelgrass meadows. *Ulva* spp. was present in all subareas, generally in close association with eelgrass, along with numerous other species of macroalgae not specifically identified in the video transects.

Fish species recorded by video were categorized based on their schooling and non-schooling behavior. A total of 775 sitings of non-schooling fish were recorded along transects oriented perpendicular and parallel to shore. Estimates of total schooling fish ranged between 16,000 and 27,000. Predominant schooling species were tubesnout

(*Aulorhynchus flavidus*), found primarily in eelgrass habitat, and shiner surfperch (*Cymatogaster aggregata*), found in open sand locations. Flatfish and ratfish, the most common non-schooling fish species, were generally found in sand. Very few rockfish and lingcod were observed; those present occurred on sand. Predominant benthic macroinvertebrates recorded by video included sea anemones (*Metridium* spp.), orange sea pens (*Ptilosarcus gurneyi*), and various sea stars. These occurred principally in open sand habitat.

This study is the first to provide complete coverage maps of major nearshore benthic habitats over a large area of Puget Sound. The combined use of side scan sonar and underwater video provided an effective tool for mapping the nearshore environment of the study area in Puget Sound. Side scan sonar provided high spatial resolution and accuracy for development of eelgrass habitat and substrate maps. The underwater video provided excellent groundtruthing of the sonar data, as well as a dataset of fish, macroalgae, and macroinvertebrate locations spatially referenced to habitat type. These data will be further analyzed and used in future studies related to the north treatment facility marine outfall siting study process.

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CONTENTS

EXECUTIVE SUMMARY	ii
ACKNOWLEDGMENTS	v
1.0 INTRODUCTION	1
1.1 Objective	1
1.2 Study Area	2
2.0 METHODS	6
2.1 Field Collection.....	6
2.1.1 Survey Design and Navigation System.....	6
2.1.2 Sidescan Sonar Data Collection.....	8
2.1.3 Underwater Video Data Collection.....	9
2.1.4 Bathymetric Data	11
2.1.5 Diver Survey	12
2.2 Data Analysis	14
2.2.1 Videography Post Processing	15
2.2.1.1 Video Analysis.....	15
2.2.1.2 Classification Scheme and Codes	17
2.2.1.3 Video QA/QC	25
2.2.2 Side Scan Imagery and GIS Map Products	26
3.0 RESULTS	29
3.1 Overview of Collected Field Data	29

3.2 Eelgrass, Substrate and Kelp Habitat Delineations	33
3.2.1 Vegetation Coverages	33
3.2.2 Substrate Coverages.....	39
3.3 Macroalgae Video Track Line Data.....	59
3.4 Fish Video Track Line Data.....	59
3.5 Macroinvertebrate Video Track Line Data	61
3.6 Quality Assurance/Quality Control.....	63
3.6.1 Postprocessing of Video Data.....	63
3.6.2 Diver Assessment Survey	66
4.0 DISCUSSION.....	68
5.0 CONCLUSIONS.....	75
6.0 REFERENCES	78

TABLES

Table 1.	Classification Categories Used for Underwater Video Post-processing.....	18
Table 2.	Eelgrass (<i>Zostera marina</i>) Classifications	18
Table 3.	Dominant Substrate and Substrate Presence Classifications	20
Table 4.	Artificial Substrate Classification	20
Table 5.	Total Macroalgae Cover Classifications	21
Table 6.	<i>Ulva</i> and <i>Ulva</i> -like Classifications	21
Table 7.	Bull Kelp (<i>Nereocystis luetkeana</i>) Classifications	21
Table 8.	<i>Sargassum muticum</i> Classifications.....	22
Table 9.	Fish Species Identified in Study Area Using the Underwater Video Camera	23
Table 10.	Macroinvertebrate Species Identified in Study Area Using the Underwater Video Camera	24
Table 11.	Eelgrass (<i>Zostera marina</i>) Polygon Coverages	27
Table 12.	Descriptions and Length of Mapped Shoreline Areas	29
Table 13.	Length and Area Covered by Video and Side Scan Sonar for Each Area.....	30
Table 14.	Basal Area Coverage of Eelgrass and Kelp	56
Table 15.	Basal Area Coverage of Substrate and Artificial Structures.....	57
Table 16.	Basal Area Estimates of Habitat Type	58
Table 17.	Percentage of Total Macroalgae Present Based on Video Track Line Length for Each Area.....	60
Table 18.	Percentage of <i>Ulva</i> and <i>Ulva</i> -like Species Based on Video Track Line Length for Each Area.....	60
Table 19.	Number of Observations of <i>Nereocystis</i> sp. and <i>Sargassum muticum</i> in Each Area.....	61

Table 20. Number of Fish Observed from Underwater Video in Each Area.....	62
Table 21. Number of Macroinvertebrates Observed from Underwater Video in Each Area.....	64
Table 22. Percent of Quality Control Errors by Error Type for Each Area.....	65
Table 23. Schooling Fish Rankings Based on Number of Observations of Fish Type in Major Habitat and Substrate Classifications.....	71
Table 24. Non-schooling Fish Rankings Based on Number of Observations of Fish Type in Major Habitat and Substrate Classifications	72
Table 25. Macroinvertebrate Rankings Based on Number of Macroinvertebrate Type in Major Habitats and Substrate Classifications	74

FIGURES

Figure 1. Location of study site in Puget Sound, Washington.....	3
Figure 2. Locations of study areas A-L within the Puget Sound study site	5
Figure 3. Instrumentation schematic on the R/V Strait Science.....	7
Figure 4. Diver assessment transects and buoy locations at the south end of Area E.....	13
Figure 5. Location of video track lines at areas A-F	31
Figure 6. Location of video track lines at areas G-L.....	32
Figure 7. Example of dense eelgrass coverage in Area A.....	34
Figure 8. Example of dense eelgrass coverage in Area K.....	34
Figure 9. Example of moderate eelgrass coverage in Area E	35
Figure 10. Example of moderate eelgrass coverage in Area K.....	35
Figure 11. Example of sparse eelgrass coverage in Area A.....	36
Figure 12. Example of sparse eelgrass coverage in Area E	36
Figure 13. Example of the interface between sand and gravel, and the shoreline edge.....	37
Figure 14. Example of sand wave near pier at north end of Area E	37
Figure 15. Example of dock and eelgrass meadows in Area B	38
Figure 16. Example of pier, pilings, and wood debris (confirmed with u/w video)	38
Figure 17(a). Vegetation cover from Picnic Point to Point Wells (Areas A – E).....	40
Figure 17(b). Vegetation cover from Point Wells to Shilshole Marina (Areas F – L)	41
Figure 18. Vegetation cover at Areas A and B.....	42
Figure 19. Vegetation cover at Areas C and D.....	43
Figure 20. Vegetation cover at Areas E and F	44
Figure 21. Vegetation cover at Areas F and G	45

Figure 22. Vegetation cover at Areas H and I.....	46
Figure 23. Vegetation cover at Areas J, K, and L	47
Figure 24(a) Substrate and habitat cover from Picnic Point to Point Wells (Areas A – E)	48
Figure 24(b) Substrate and habitat cover from Point Wells to Shilshole Marina (Areas F – L).....	49
Figure 25. Substrate cover at Areas A and B	50
Figure 26. Substrate cover at Areas C and D	51
Figure 27. Substrate cover at Areas E and F	52
Figure 28. Substrate cover at Areas F and G.....	53
Figure 29. Substrate cover at Areas H and I.....	54
Figure 30. Substrate cover at Areas J, K, and L	55

APPENDICES

- Appendix A** Video analysis Forms
- Appendix B** Attribute information for GIS data files
- Appendix C** Mapped video observations of eelgrass for areas A - L
- Appendix D** Mapped video observations of dominant substrate for areas A - L
- Appendix E** Video observations of artificial substrates and debris for areas A - L
- Appendix F** Mapped video observations of total macroalgae for areas A - L
- Appendix G** Mapped video observations of *Ulva* for areas A - L
- Appendix H** Mapped Video observations of *N. luetkeana* and *S. muticum* for areas A - L
- Appendix I** Fish observations from underwater videography in eelgrass and substrate.
- Appendix J** Mapped video observations of fish for areas A - L
- Appendix K** Macroinvertebrate observations from underwater videography in eelgrass
and substrate
- Appendix L** Mapped video observations of macroinvertebrates for areas A - L
- Appendix M** Mapped video observations of juvenile sea pen densities for areas A - L.
- Appendix N** QA/QC independent observations of discrepancies noted from video
footage